

CLAIMS

What is claimed is:

1. A feed, feed supplement, or therapeutic composition comprising siRNA or dsRNA, such siRNA or dsRNA being expressed in an organism, and capable of being processed into siRNA that inhibit an animal pathogen.
2. The feed, feed supplement, or therapeutic composition of claim 1, wherein said pathogen is a virus, bacteria, or fungi.
3. The feed, feed supplement, or therapeutic composition of claim 2, wherein said virus is selected from White Spot Syndrome Virus, Taura Syndrome Virus, Yellow Head Virus, and Infectious Hypodermal and Hematopoietic Virus.
4. The feed, feed supplement, or therapeutic composition of claim 2, wherein said virus is selected from porcine parvovirus (PPV), exotic Newcastle disease, foot and mouth disease (FMD), feline leukemia virus (FLV), canine parvovirus.
5. The feed, feed supplement, or therapeutic composition of claim 2, where said bacterium is selected from aquacultural or agricultural bacterial pathogens.
6. The feed, feed supplement, or therapeutic composition of claim 5, wherein said aquacultural bacterial pathogen is selected from *Aeromonas spp.*, *Edwardsiella spp.*, *Flavobacterium spp.*, *Flexibacter spp.*, *Mycobacterium sp.*, *Streptococcus spp.*, *Salmonella spp.*, *Vibrio spp.*, and *Yersinia reuckeri*.
7. The feed, feed supplement, or therapeutic composition of claim 5, wherein said agricultural bacterial pathogen is selected from *Mycobacterium spp.*, *Enterococcus spp.*, *Streptococcus spp.*, *Salmonella spp.*, and *Yersinia pestis*.
8. The feed, feed supplement, or therapeutic composition of claim 2, wherein said fungus is selected from aquacultural or agricultural fungal pathogens.
9. The feed, feed supplement, or therapeutic composition of claim 8, wherein said aquacultural fungal pathogen is selected from *Oomycetes* fungi, *Aphanomyces astaci*, and *Ichthyophonus spp.*
10. The feed, feed supplement, or therapeutic composition of claim 8, wherein said agricultural fungal pathogen is selected from *Trychophyton spp.*, *Fusarium solani*, and *Candida spp.*
11. The feed, feed supplement, or therapeutic composition of claim 1, wherein said pathogen is a eukaryote.

12. The feed, feed supplement, or therapeutic composition of claim 10, wherein said eukaryote is selected from ciliates, amoeba, protozoa, microsporea, myxosporia, platyhelminthes, nematodes, and sporozoa.

13. The feed, feed supplement, or therapeutic composition of claim 1, wherein said animal is an aquatic animal.

14. The feed, feed supplement, or therapeutic composition of claim 13, wherein said aquatic animal is a crustacean.

15. The feed, feed supplement, or therapeutic composition of claim 14, wherein said crustacean is selected from shrimp, Artemia, lobster, crab, crayfish, prawn.

16. The feed, feed supplement, or therapeutic composition of claim 13, wherein said aquatic animal is a fish.

17. The feed, feed supplement, or therapeutic composition of claim 16, wherein said fish is selected from salmon, trout, halibut, turbot, striped bass, perch, tilapia, catfish, and carp.

18. The feed, feed supplement, or therapeutic composition of claim 1, wherein said animal is a terrestrial animal.

19. The feed, feed supplement, or therapeutic composition of claim 18, wherein said terrestrial animal is selected from horse, dog, cat, cow, sheep, goat, poultry, birds, mink, pig, hamster, mouse, rabbit, rat, gerbil, and guinea pig.

20. The feed, feed supplement, or therapeutic composition of claim 1, wherein said siRNA or dsRNA is expressed in organisms selected from insect, bacteria, fungi, bacteriophage, plants, and yeast.

21. The feed, feed supplement, or therapeutic composition of claim 20, wherein said organisms are included in the feed as whole or mostly whole cells.

22. The feed, feed supplement, or therapeutic composition of claim 20, wherein said organisms are included in the feed as broken or mostly broken cells.

23. The feed, feed supplement, or therapeutic composition of claim, 20, wherein the organism biomass is encapsulated.

24. The feed, feed supplement, or therapeutic composition of claim 23, wherein the encapsulation is accomplished using material selected from digestible polymer, non-digestible polymer, phospholipids, chitosan and alginate.

25. A method of protecting an animal from a pathogen comprising feeding said animal a feed, further comprising siRNA or dsRNA, wherein said siRNA or dsRNA being expressed in an organism, and said siRNA or dsRNA capable of being processed into siRNA and down regulating the expression of animal pathogen by RNA interference.

26. The method of Claim 25, wherein said pathogen is a virus, bacteria, or fungi.

27. The method of claim 26, wherein said virus is selected from White Spot Syndrome Virus, Taura Syndrome Virus, Yellow Head Virus, and Infectious Hypodermal and Hematopoietic Virus.

28. The method of claim 26, wherein said virus is selected from porcine parvovirus (PPV), exotic Newcastle disease, foot and mouth disease (FMD), feline leukemia virus (FLV), canine parvovirus.

29. The feed, feed supplement, or therapeutic composition of claim 26, wherein said bacterium is selected from aquacultural or agricultural bacterial pathogens.

30. The feed, feed supplement, or therapeutic composition of claim 29, wherein said aquacultural bacterial pathogen is selected from *Aeromonas spp.*, *Edwardsiella spp.*, *Flavobacterium spp.*, *Flexibacter spp.*, *Mycobacterium sp.*, *Streptococcus spp.*, *Salmonella spp.*, *Vibrio spp.*, and *Yersinia reuckeri*.

31. The feed, feed supplement, or therapeutic composition of claim 29, wherein said agricultural bacterial pathogen is selected from *Mycobacterium spp.*, *Enterococcus spp.*, *Streptococcus spp.*, *Salmonella spp.*, and *Yersinia pestis*.

32. The feed, feed supplement, or therapeutic composition of claim 26, wherein said fungus is selected from aquacultural or agricultural fungal pathogens.

33. The feed, feed supplement, or therapeutic composition of claim 32, wherein said aquacultural fungal pathogen is selected from *Oomycetes fungi*, *Aphanomyces astaci*, and *Ichthyophonus spp.*

34. The feed, feed supplement, or therapeutic composition of claim 32, wherein said agricultural fungal pathogen is selected from *Trychophyton spp.*, *Fusarium solani*, and *Candida spp.*

35. The method of claim 25, wherein said pathogen is a eukaryote.

36. The method of claim 35, wherein said eukaryote is selected from ciliates, amoeba, protozoa, microsporea, myxosporia, platyhelminthes, nematodes, and sporozoa.

37. The method of claim 25, wherein said animal is an aquatic animal.

38. The method of claim 37, wherein said aquatic animal is a crustacean.
39. The method of claim 38, wherein said crustacean is selected from shrimp, Artemia, lobster, crab, crayfish, prawn
40. The method of claim 37, wherein said aquatic animal is a fish.
41. The method of claim 40, wherein said fish is selected from salmon, trout, halibut, turbot, striped bass, perch, tilapia, catfish, and carp.
42. The feed, feed supplement, or therapeutic composition of claim 25, wherein said animal is a terrestrial animal.
43. The feed, feed supplement, or therapeutic composition of claim 42, wherein said terrestrial animal is selected from horse, dog, cat, cow, sheep, goat, poultry, birds, mink, pig, hamster, mouse, rabbit, rat, gerbil, and guinea pig.
44. The method of claim 25, wherein said siRNA or dsRNA is expressed in organisms selected from insect, bacteria, fungi, bacteriophage, plants, and yeast.
45. The method of claim 44, wherein said organisms are included in the feed as whole or mostly whole cells.
46. The method of claim 44, wherein said organisms are included in the feed as broken or mostly broken cells.
47. The method of claim, 44, wherein the organism biomass is encapsulated.
48. The method of claim 47, wherein the encapsulation is accomplished using material selected from digestible polymer, non-digestible polymer, phospholipids, chitosan and alginate.
49. The method in Claim 25, wherein a feed that is supplemented with a recombinant bacterial cells containing 21 to 23 nucleotide long that selectively degrade the homologous mRNA with a disease-causing element to reduce or alleviate a disease state.